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Observing the Evolution of Typhoon Wakes

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LONG-TERM GOALS

The long-term goal of this work is to observe, understand, quantify and parameterize upper-ocean mixing for use in global ocean modeling.

OBJECTIVES

Our research program is to observe the temporal and spatial evolution of typhoon wakes, in particular we plan to directly observe the mixing associated with turbulence generated by the strong air-sea interaction in a typhoon. These observations will be used to make quantifiable assessments of mixed layer models under the extreme conditions of a typhoon.

APPROACH

We will make these observations by equipping Seagliders and Webb Gliders with microstructure sensors and then deploying them prior to the passage of a typhoon in the Western Pacific Ocean and in its wake. Also, a ship-based survey of the evolution of the typhoon wake will be undertaken to observe the restratification and collapse of the cold wake.

WORK COMPLETED

The planning of the observational field program has been the focus of the work completed thus far, with several meetings of the ITOP and Typhoons DRI investigators having taken place, and another coming in November, 2009 in Taiwan. The integration and testing of microstructure sensors on the gliders is ongoing. In collaboration with Louis St. Laurent, a Webb glider has been outfitted with Rockland Scientific microstructure probes, and a successful test was performed in Ashumet Pond in Falmouth, MA this past spring. Integration of similar microstructure sensors is underway at APL/UW in collaboration with Luc Rainville and Craig Lee.

RESULTS

As we are still in the planning stages for the field program that will occur next summer, beyond the on-going integration and testing of the microstructure sensors onto the gliders, we have no scientific results to report.

IMPACT/APPLICATIONS

The technical problem of integrating and testing microstructure sensors on gliders is well underway, and this field program offers an excellent opportunity for using these technical developments to study an important scientific problem while providing a new measurement capability to the oceanographic community.

RELATED PROJECTS

Related to this project is my work in understanding and parameterizing mixing in global ocean models, such as the Community Climate System Model (<http://www.cesm.ucar.edu/>), and a newly proposed Climate Process Team on the same subject.